Stars observed as Occulted, but not given in Dr. Döllen's List.

			Estimated Position Angle.
(1)	9 34 1·4		85
(2)		9 37 59·2	160
(3)	9 33 24·2		80
(4)		10 13 47·8	315

Approximate coordinates of the Four Occulted Stars not given in Dr. Döllen's List.

R.A. of (1) =	R.A. of 85 + 4′ 14″	Decl. of (1) =	Decl. of 85 + 2′ 5″
„ (2) =	„ 76 + 3 47	„ (2) =	„ 76 + 0 39
„ (3) =	„ 85 + 4 31	„ (3) =	„ 85 + 3 37
„ (4) =	„ 81 − 7 27	„ (4) =	„ 81 + 5 9

Owing to the peculiar condition of the occulting limb in respect of illumination, the observations of Immersion were practically more difficult than those of Emersion. The observations of Emersion of stars not predicted may possibly have been affected by unexpectedness of the phenomenon and the greater faintness of the stars.

Altogether 22 phenomena were observed, including the occultation of the four faint stars not predicted in Dr. Döllen's list.

University Observatory, Oxford:
1884, *Nov.* 13.

Total Eclipse of the Moon, 1884, *October* 4. *Observed at the Radcliffe Observatory, Oxford.*

(*Communicated by E. J. Stone, M.A., F.R.S.*)

This eclipse was observed at the Radcliffe Observatory, Oxford, with the only two instruments available for the purpose, the Heliometer of 7·5-inches aperture, and the 7-inch Equatorial. Both semi-lenses of the Heliometer were used, but the images were practically coincident. The faint stars occulted before totality were looked for, but none could be observed until the No. 63 of Struve's list. The observations with the Heliometer were made by Mr. Wickham, those with the Equatorial by Mr. Robinson. As there were only two instruments available, I merely watched the eclipse with the naked eye. The eclipse was much the darkest that I have ever seen, and just before the instant of totality it appeared as if the Moon's surface would be invisible to the naked eye during totality; but such was not the case; for with the last appearance of the bright reflected sunlight there appeared a dim circle of light around the Moon's disk, and the whole surface became faintly visible, and continued so until the end of totality.

Occultations of Stars during the Total Eclipse of the Moon of October 4, 1884.

No in Struve's List.	Name of Object.	Phenomenon.	Instrument.	Time Noted.	Time by Sidereal Standard.	Local Sidereal Time.	Greenwich Mean Time of Observation.	Observer.	Ref. to Notes
				h m s	h m s	h m s	h m s		
63	Arg. Z. + 4° No. 126	Disappearance	Heliometer	21 54 33·3	21 54 11·90	21 53 33·67	9 2 48·13	W.	
63	,,	,,	10-foot telescope	21 54 29	21 54 11·50	21 53 33·27	9 2 47·73	R.	(*a*)
71	* 10 Mag.	Disappearance	Heliometer	22 3 25	22 3 3·59	22 2 25·36	9 11 38·37	W.	
85	* 10 Mag.	Disappearance	Heliometer	22 15 38·2	22 15 16 78	22 14 38·55	9 23 49·56	W.	
82	* 10 Mag.	Disappearance	Heliometer	22 16 1·2	22 15 39·78	22 15 1·55	9 24 12·50	W.	
81	Arg. Z. + 4° No. 129	Disappearance	Heliometer	22 25 12·0	22 24 50 57	22 24 12·34	9 33 21·78	W.	(*b*)
81	,,	,,	10-foot telescope	22 25 7·95	22 24 50·42	22 24 12·19	9 33 21·63	R.	(*c*)
69	Arg. Z. + 3° No. 111	Reappearance	Heliometer	22 31 20·5	22 30 59·06	22 30 20 83	9 39 29·26	W.	
69	,,	,,	10-foot telescope	22 31 18	22 31 0·46	22 30 22·23	9 39 30·66	R.	(*d*)
74	Arg. Z. + 3° No. 112	Reappearance	Heliometer	22 42 1·3	22 41 39·85	22 41 1·61	9 50 8·30	W.	
74	,,	,,	10-foot telescope	22 41 56·3	22 41 38·75	22 41 0·51	9 50 7·20	R.	(*e*)
94	* 9–10 Mag.	Disappearance	Heliometer	22 58 30	22 58 8·54	22 57 30·30	10 6 34·29	W.	(*f*)
94	,,	,,	10-foot telescope	22 58 24·5	22 58 6·94	22 57 28·70	10 6 32·69	R.	(*g*)
95	Arg. Z. + 4° No. 131	Disappearance	Heliometer	23 3 39·2	23 3 17·74	23 2 39·50	10 11 42·64	W.	
95	,,	,,	10-foot telescope	23 3 35·7	23 3 18·14	23 2 39·90	10 11 43·04	R.	(*h*)
82	* 10 Mag.	Reappearance	Heliometer	23 6 28·0	23 6 6·53	23 5 28·29	10 14 30·97	W.	(*i*)
82	,,	,,	10-foot telescope	23 6 24·0	23 6 6·43	23 5 28 19	10 14 30·87	R.	(*j*)
85	* 10 Mag.	Reappearance	Heliometer	23 22 49·5	23 22 28·02	23 21 49·78	10 30 49·78	W.	(*k*)
109	Arg. Z. + 4° No. 133	Disappearance	Heliometer	23 28 24·2	23 28 2·71	23 27 24·47	10 36 23·56	W.	
109	,,	,,	10-foot telescope	23 28 20·0	23 28 2·41	23 27 24·17	10 36 23·26	R.	(*l*)
107	* 9–10 Mag.	Disappearance	Heliometer	23 29 42·2	23 29 20·71	23 28 42·47	10 37 41·35	W.	(*m*)

Notes.

(*a*) Fair observation, but could not secure exact tenth of second. (*b*) Seemed somewhat brighter than 9·5. (*c*) Instantaneous; observation very good. (*d*) May be a second late; was not looking at the exact point of reappearance. (*e*) Instantaneous. Counting $\frac{1}{2}$ sec. fast after occultation (reappearance), but observer picked up correct second before observation. (*f*) "Gradual" disappearance. (*g*) Very fair observation. (*h*) Seemed to enter limb 2^s or 3^s and then vanished suddenly; time noted satisfactory. (*i*) Good. (*j*) Good; instantaneous. (*k*) Not quite certain; star very faint. (*l*) Good; instantaneous. A faint companion (Struve's List, No. 108) disappeared just before this time. (*m*) Faint.

Power used:—Heliometer 80: 10-foot telescope 109. For Struve's List see *Astronomische Nachrichten*, Band 109. No. 2615.

In converting Oxford Mean Solar Times into Greenwich Mean Solar Times the following Longitude has been used: $5^m\ 2^s{\cdot}60$ W.

Occultations of Stars observed at Dun Echt during the Total Lunar Eclipse of October 4, 1884.

(*Communicated by Lord Crawford.*)

1. Observations with the Grubb Equatorial of 15·06-ins. aperture, power 122; observer, Ralph Copeland.

No. in the Pulkowa List.	Magnitude.	Phenomenon.	Observed Time by Chronometer.	Dun Echt Mean Time.
			h m s	h m s
94	9–10	Disappearance	10 16 24·5	10 6 41·8
			by Chronograph	
95	9·5	Disappearance	23 5 46·8	10 10 45·3
82	10	Reappearance*	23 9 50·7	10 14 48·5
85	10	„	23 22 9·5	10 27 5·3
81	9·5	„	23 22 59·7	10 27 55·4
109	8·8	Disappearance	23 25 56 4	10 30 51·6
108	9–10	„ †	23 25 57·2 − 0s·5	10 30 51·9
107	10	„ ‡	23 28 23·4	10 33 18·2

		m	s	s	
The chronometer corr. at $7^h·9760$ by chronom.	=	−9	41·73	−0·4158	per hr.
The chronograph corr. at $22^h\ 35^m·3$ by chronog.	=	+	59·34	+0·0822	„

State of Weather and General Remarks.

Although there were only a few cumulus clouds scattered over the heavens, and the sky in general was fairly clear, the illuminated haze around the Moon was too bright to permit of stars 57, 62, 69, and 71 of the Pulkowa list being seen at all, even in the 15-in. telescope. No. 74, of the 9·3 magnitude, was, in fact, the first star made out, and that only with extreme difficulty, shortly before its disappearance, which took place

Notes.

* 82 reappeared suddenly.

† (108) Signal given half a second too late; the disappearance followed so closely on that of 109, that the key could not be pressed early enough for the second record.

‡ (107) The Moon's limb was of a bright primrose colour, and the star appeared to cling to the edge for several seconds before disappearing.

By the time ($10^h\ 16^m·6$ G.M.T) when 94 ought to have reappeared, the sky had become quite white through illumination by the uneclipsed part of the Moon, and the limb was not visible for more than 3′, or at most 4′ from the northern cusp. The 9^m star, 106*a*, the place of which is given below, was seen at $11^h\ 21^m$ G.M.T., about two minutes after egress, and its reappearance might have been observed if attention could have been directed to the *exact* place of emergence. On the other hand, the $8^m·8$ star 109, which was predicted to reappear at $11^h\ 49^m\ 50^s$ G.M.T., although caught sight of about 30^s later, was then so very faint that its egress could not have been observed with more certainty than that of a comparatively small star at the Moon's bright limb under ordinary conditions. Its 9–10 mag. companion, 108, was indistinguishable in the glare, and within about another minute the star itself had disappeared in the increasing light of the emerging Moon.